Henry Skinner

MAY, 1923

ENTOMOLOGICAL NEWS

Vol. XXXIV No. 5

WILLIAM HARRIS ASHMEAD
1855-1908

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PHILADELPHIA, PA.
THE ACADEMY OF NATURAL SCIENCES.
Logan Square

Entered at the Philadelphia, Pa., Post Office as Second Class Matter.
Acceptance for mailing at the special rate of postage prescribed for in Section 1103,
Act of October 3, 1917, authorized January 15, 1921.

ENTOMOLOGICAL NEWS,
ACAD. NAT. SCI.
PHILADELPHIA, PENN'A.

ENTOMOLOGICAL NEWS

published monthly, excepting August and September, in charge of the Entomological Section of The Academy of Natural Sciences, Philadelphia, and The American Entomological Society.

ANNUAL SUBSCRIPTION, $2.50 IN ADVANCE
FOREIGN SUBSCRIPTIONS, $2.70 IN ADVANCE
SINGLE COPIES 30 CENTS

ADVERTISING RATES: Full width of page. Payments in advance.

One issue,	1 in.,	$ 1.20,	2 in.,	$ 2.40,	half page,	$ 4.00,	full page.,	$ 8.00
Five issues,	"	5.50,	"	11.00,	"	17.50,	"	35.00
Ten issues	"	11.00,	"	20.00,	"	35.00,	"	70.00

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ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

VOL. XXXIV MAY, 1923 No. 5

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Studies on Costa Rican Odonata.

X. Megaloprepus, Its Distribution, Variation, Habits and Food.

By PHILIP P. CALVERT, University of Pennsylvania, Philadelphia, Pa.

Megaloprepus caerulatus, of all living Odonata, has the greatest wing-expanse, attaining, at the maximum, 190 mm., while the long and slender abdomen is recorded to reach 102 mm. in the male and 97 mm. in the female. It is an inhabitant of the continental American tropics from the State of Vera Cruz, Mexico, to central Bolivia.

DISTRIBUTION IN COSTA RICA.

In the *Biologia Centrali-Americana* it was cited from the following localities in Costa Rica: Cachí (misspelled Caché), Carrillo, Santa Clara and finally Quebrada de Java in southern Costa Rica. Dr. Ris[1] has examined specimens from near Tuis

[1]Archiv f. Naturgesch. 82 Jahrg., Abt. A, 9 Heft, S. 65. 1918.

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(3 ♂ 4 ♀) and Infernillo (=Juan Viñas) (1 ♂ 1 ♀) at 1000 meters elevation, and from near Orosi (1 ♂ 4 ♀) at 1500 meters, as well as 9 ♂ 1 ♀ without definite locality from that country. The following Costa Rican specimens are before me, taken by myself, except where the name of another collector is specified:

Atlantic Slope: Near Guápiles, 300 meters, 980 feet, ♂ No. 1, forest, June 2, 1909. Near Guápiles, 1 ♂ No. 13, July 13, 1915, D. E. Harrower. Florida Road, west of Guápiles, forest, 3 ♂ ♂, Nos. 2-4, June 3, 1909; 1 ♂ No. 5, 1 ♀ No. 6, June 5, 1909, W. Schaus & J. Barnes; 1 ♂ No. 7, Nov. 18, 1909. Guacimo, ca. 240 meters, banana field, 1 ♀ No. 8, June 7, 1909, Messrs. Stähle & Blair. Peralta. 320 meters, Chiriqui [?] River trail, 1 ♀ No. 9, August 10, 1910. Estrella, below 250 meters, 1 ♂ No. 10, 1 ♀ No. 11, April 22, 1916, C. H. Lankester. Ontario Farm [between the Reventazon and Parismina Rivers], below 100 meters, 1 ♂ No. 12, September 17, 1919, C. H. Lankester.

My field note books contain the following records of this species, although specimens were not taken: Holanda Farm, Agua Buena Creek, November 7, and Rio Banana, forest near the Limon reservoir, November 9, 1909, both localities below 100 meters. Peralta (see above), tropical forest, August 7, 1909. Juan Viñas, bottom of the cañon of the Rio Reventazon, 760 meters, 2500 feet, June 25, 1909; road down the same cañon at above 3000 feet, the highest altitude at which I saw this species, September 29, 1909. In August, 1909, in the Museo Nacional, at San José, I saw a male labeled as taken at Carrillo, July, 1909, by P. Biolley, Jr.[2]

Pacific Slope: Near Alajuela, 980 meters, 3200 feet, 1 ♂ No. 14, August 8, and 1 ♂ No. 15, August 12, 1915, D. E. Harrower. Aguacate Mountains [500-1000 meters?], 1 ♂ No. 16, July, 1914, C. H. Lankester.

Variation.

In 1860, De Selys recognized three "races" of this species: *caerulatus, brevistigma* and *latipennis*.[3] In 1886, having found intermediates between the first and the third of these, only two races were maintained, *caerulatus* and *brevistigma*,[4] and the latest opinion which he expressed,[5] as well as that of Dr. Ris (1918),[6] is to the same effect. In consequence of some corre-

[2] For the localities cited see A. S. and P. P. Calvert, A Year of Costa Rican Natural History, New York, MacMillan Co., 1917.

[3] Bull. Acad. roy. Belg. (2), x, pp. 13-14. [4] Mem. Couron. Acad. Belg. xxxviii, p. 7. [5] Annales Soc. Ent. Belg. xxxiv, Comptes Rendus, p. cxx. 1890.

[6] Dr. Ris, *l. c.*, p. 64, says "Calvert endlich (Biol. C. A. Neur, p. 51, 352—1901, 07) lässt auch *brevistigma* fallen." Nothing is said in the *Biologia* volume about *brevistigma*, but reference *is* made to *latipennis*.

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spondence with Prof. T. D. A. Cockerell, who raised the question of the specific distinctness of *brevistigma,* I have examined the Costa Rican material and a few South American specimens referable to, or near to, *brevistigma* in some detail. These latter specimens are:

2 ♂, Nos. 21, 23, 1 ♀ No. 22, head waters of the Rio Carare, (Rio Minero), in woods near the emerald mines of Muzo, Colombia, 2000-5000 feet, Terry Duce, collector, studied by Prof. Cockerell and lent to me by him; 1 ♀ No. 19, "Brésil," from M. René Martin's collection; 1 ♀ No. 20, road to Coroico, Yungaz, Bolivia, April 20, 1899, W. J. Gerhard (the last two in the Academy of Natural Sciences of Philadelphia).

Some of the results of this examination follow.

Length of abdomen ♂: Guápiles 70-103 (5 ♂ ♂, June) Estrella 91, Ontario Farm 81, Alajuela 86 (2 ♂ ♂), Rio Carare 80, 99 mm.; ♀: Costa Rica 72-84 (4 ♀ ♀ listed above), R. Carare 66, Brésil 88, Coroico 90 mm.

Length and maximum width of left hind wing and ratio of the first to the second of these dimensions, ♂: Guápiles (5 ♂ ♂, June) 59-92 mm., 14-23.5 mm., 3.72-4.21; Estrella 78 mm., 20 mm., 3.9; Ontario Farm 64 mm., 16 mm., 4.0; Alajuela 66, 72 mm., 17, 18.5 mm., 3.88, 3.89; Rio Carare 68, 79 mm., 17 mm., 4.0, 4.65. ♀: Costa Rica (4 ♀ ♀) 64-73 mm., 17-20 mm., 3.65-3.88. Rio Carare 57 mm., 14 mm., 4.07; Brésil 77 mm., 15.5 mm., 4.97; Coroico 80 mm., 17 mm., 4.71.

Pseudopterostigma, *total* number of cells, *both front* wings, ♂: Guápiles (5 ♂ ♂, June) 10-6, Estrella 6-8, Ontario Farm 5-6, Alajuela 6-10, Rio Carare 3-11; ♀: Costa Rica (4 ♀ ♀) 12-17, Rio Carare 10-11, Brésil 4-6, Coroico 6.

Pseudopterostigma, length of costal margin on *left hind* wing, and *total* number of cells *both hind* wings, ♂: Guápiles (5 ♂ ♂, June) 2.74-4.14 mm., 4-10 cells; Estrella 3.33 mm., 5-6; Ontario Farm 2.96 mm. (4+ -5; Alajuela 2.81, 3.48 mm., 6-10; R. Carare 2.29, 3.18 mm., 2+-9; ♀: Costa Rica (4 ♀ ♀) 2.96-3.85 mm., 8-12; Rio Carare 2.44 mm., 6-7+; Brésil 2.0 mm., 3-4; Coroico 2.96 mm., 5-6. (These measurements by eye-piece micrometer, Zeiss binocular, oc. 4 obj. *F*55.

Dark band of *front* wings; (*a*) greatest length measured parallel to the costa, position of its proximal edge (*b*) in reference to the point of origin of vein *M*2 (nodal sector) in cells and also (*c*) in reference to the fork of *M*4 (short sector) in cells. ♂: Guápiles (5♂ ♂, June) *a* 27-19 mm., *b* 3 proximal—3 distal [1], *c* 2 proximal—1 distal; Estrella *a*

[1] This means that in the five males from near Guápiles, taken in June, the position of the proximal edge of the dark band of the front wings varied from three cells proximal to the point of origin of *M*2 to three cells distal to the same point, and similarly in the other statements.

20 mm., *b* 7 Left 8 Right distal, *c* 7 R 5 L distal; Ontario Farm *a* 21 mm., *b* 5½ L (origin of M2 irregular on the right, *c* 10 R 7 L proximal; Alajuela *a* 17-19 mm., *b* 2-4½ distal, *c* 1 proximal—3 distal; R. Carare *a* 12, 19 mm., *b* 2 R, 3 L, 13 L distal, *c* 3 R, 5 L, 15 L distal. ♀ : Costa Rica (4 ♀ ♀) *a* 15-20 mm., *b* less than 1-7 distal, *c* 1½ proximal—5 distal; R. Carare *a* 16 mm., *b* ½ R 1 L distal, *c* 1½ proximal R, at the fork L; Brésil *a* 12 mm., *b* 7 distal, *c* 11 L, 13 R distal; Coroico *a* 16 mm., *b* 3 R 4 L distal, *c* 11 R 8 L distal.

Ratio of (*d*) the point of origin of *M2* and (*e*) of the fork of *M*4 to the length of the *front* wing, ♂ : Guápiles (5 ♂ ♂, June) *d*. .62-.65[a], *e* .68-.69; Estrella *d*. .62, *e* .66; Ontario Farm *d* .71, *e* .74; Alajuela *d* .61, .64, *e* .69, .73; R. Carare *d* .63, .65, *e* .66, .68; ♀ : Costa Rica (4 ♀ ♀) *d* .58-.63, *e* .66-72; R. Carare *d* .62 R .64 L, *e* .70 R .67 L; Brésil *d* .69, *e* .68; Coroico *d* .68 R .67 L, *e* .66. I have also measured the same ratio for M2 in the *left hind* wing and find only a slight difference in the second decimal place from that given for the front wing of each individual.

Distance (*f*) from the nodus to the origin of *M2*, (*g*) from the origin of *M2* to its end on the wing margin, (*h*) *difference between* (*f*) and (*g*), all in millimeters and with reference to the *left hind* wing only, ♂ : Guápiles (5 ♂ ♂, June) *f* 27 to 41, *g* 20.5 to 34.5, *h* 5 to 7.5; Estrella *f* 35, *g* 30, *h* 5; Ontario Farm *f* 30, *g* 21, *h* 9; Alajuela *f* 32, 29, *g* 27, 24.5, *h* 5, 4.5; R. Carare *f* 31, 36.5, *g* 26, 28, *h* 5, 8.5; ♀ : Costa Rica (4 ♀ ♀) *f* 28 to 31, *g* 25 to 29.5, *h* 1 to 4; R. Carare *f* 28, *g* 19, *h* 9; Brésil *f* 39, *g* 25, *h* 14; Coroico *f* 39, *g* 28, *h* 11.

Length of the fork of *Cu* 1 measured from the bifurcation to the end of the distal branch at wing margin, all in millimeters, ♂ : Guápiles (5 ♂ ♂, June) 6-10+ front, 8.5-10+ hind; Estrella 10 + f, h; Ontario Farm 6 f, 9-9.5 h; Alajuela 5 f, 6-11.5 h; R. Carare 4.5-7 f, 3-10 h; ♀ : Costa Rica (4 ♀ ♀) 10+ f (7 in one wing only), 7.5-10+ h; R. Carare 3.5 f, 6.5-7.5 h; Brésil 4-4.5 f, h; Coroico 2 f, 3-5. h (f=front, h=hind wings).

The branches of the fork of *Cu*1 do not extend into the dark band of the wings of the larger ♂ Rio Carare, Brésil ♀, Coroico ♀, nor on the right hind wing of the Aguacate ♂ ; on the other three wings of this last ♂ only the most distal secondary branch of the fork reaches the band. In all the remaining specimens listed above the branches of the fork extend into the band to a distance varying in different individuals; in some of them the point of bifurcation lies within the band, in others it is proximal to the band.

A milky band is present bordering the proximal margin of the dark band of the wings in ♂ ♂ Nos. 3, 7, 10, 12, 13, 14, 15, 21; traces of it

[a] This highest ratio is that of the smallest of the five males and the only one of the five in which the proximal edge of the dark band is proximal to the origin of *M2*; the *e* ratio for this same male is .683.

are visible in ♂ No. 1, ♀ ♀ Nos. 8, 9, 22; it is entirely absent in ♂ ♂ Nos. 2, 4, 5, 16, 23, ♀ ♀ Nos. 6, 11, 19, 20. Milkiness distal to the dark band is present in ♂ ♂ Nos. 16, 23, ♀ ♀ Nos. 6, 8, 11, 19, 20, 22*; traces of it are visible in ♂ ♂ Nos. 1, 3, 10, 12, 13, 14, 15, 21; it is absent in ♂ ♂ Nos. 2, 4, 5, 7.

Transverse diameter of median ocellus (*i*), maximum diameter of right lateral ocellus (*k*), ♂ : Guápiles (5 ♂ ♂, June) *i* .37-.44, *k* .30-.44; Estrella *i* .39, *k* .37; Ontario Farm *i* .44, *k* .37; Alajuela *i* .37, *k* .37; R. Carare *i* .37, .44; *k* .33, .52; ♀ : Costa Rica (4 ♀ ♀) *i* .36-.44, *k* .30-.44; R. Carare *i* .30, *k* .30; Brésil *i* .44, *k* .41; Coroico *i* .39, *k* .38. All the dimensions are in millimeters by eye-piece micrometer, Zeiss binocular, oc. 4 obj. F55.

These preceding data may be directly compared with those of Dr. Ris (1918) based on a more extensive series of specimens from several other countries in addition to Costa Rica. He has given definitions for distinguishing the races *caerulatus* and *brevistigma* founded on five major characters. An examination of his data on which these definitions are based clearly shows that the one race grades into the other.

The twenty-four Costa Rican examples whose data he gives fall, for the most part, within the two limits of each character assigned to the race *coerulatus;* however, in five of his individuals the fork of *Cu*1 is less than 10 mm. long (in two of the five less than 5 mm.), and in five the ratio of the length to the width of the hind wing exceeds 4.0.

Of the sixteen specimens from Costa Rica discussed in the present paper, 12 out of the total of 32 front wings and 6 out of the 32 hind wings have the fork of *Cu* 1 shorter than 10 mm. Even the smallest individual (♂ No. 4), hind wing 59 mm., has the dark band of the wings 19 mm. wide. Four examples (Nos. 2, 3, 4, 16) have the ratio of length to width, left hind wing, exceeding 4.0 viz.: 4.06, 4.10, 4.21, 4.69, respectively. The extreme range of the difference *h* (see above) is from + 1 (♀ No. 6) to + 9 (♂ No. 12), and of the length of the costal edge of the pseudopterostigma, left hind wing, is from 2.74 (♂ No. 4) to 4.37 (♂ No. 13) mm.

Yet all of these sixteen individuals are to be referred to race *coerulatus;* even ♂ No. 16 whose relatively narrow wings would place it in *brevistigma* is *coerulatus* in the other four characters of Dr. Ris, and the short fork of *Cu*1 (7-8.5 mm. except in the left hind wing where it is 10 mm.) and the short

* In ♀ No. 9 (Peralta) is no distal milkiness but there are two patches of white veins in its place.

pseudopterostigma of ♂ No. 4 only place it in the intermediate condition between *brevistigma* and *coerulatus*, while its other three characters are those of *coerulatus*.

If we write the individual numbers of the entire twenty-one specimens studied in this paper in the order of their magnitudes, from one extreme to the other for each character, thus

♂	5	3	12	7	13	2	10	4	21	1	14	15	16	23	♀	8	9	6	11	20	22	19
	13	3	5	7	14	2	10	16	21	1	12	15	4	23		6	9	8	11	20	22	19

in which the upper line is for the greatest length of the dark band of the hind wing and the lower line for the length of the costal edge of the pseudopterostigma of the left hind wing, we observe a correlation of these two characters in 8 out of a possible 14 for the males and 5 out of a possible 7 for the females. That these correlations are not exactly correlated with locality may be seen by comparing the individual numbers and their habitats as given on page 130, *anteá, e. g.* ♂ ♂ Nos. 21 and 23, 14 and 15.

It seems hardly useful to occupy more space by giving similar examples of the degree of correlation between other characters studied. Suffice it to say that the maximum number observed for the males is 11 (between the length of the hind wing and the distance from the origin of *M2* to its end) and 7 for the females (*not* for the same pair of characters just given as showing the maximum correlation for the males, but between the length of the hind wing and the distance from either the base of the wing or the nodus to the origin of *M2* and also the length of the abdomen).

For the sake of completeness be it added that of the five non-Costa Rican specimens used for comparison in this paper (page 131 *anteá*) only the Brésil ♀ No. 19 is *brevistigma* by all five of Dr. Ris' characters; then follow in order: ♂ No. 23, ♀ No. 20, ♀ No. 22, ♂ No. 21, the last being more *coerulatus* than *brevistigma*.

De Selys wrote in 1890 *l. c.*: "Le Dr. Hagen me demande encore si le nom de *Meg. caerulatus* (Drury) ne s'applique pas mieux á la race *brevistigma*, Selys, qu'à celle que j'ai considérée comme type de l'espéce et que Drury avait recue de Honduras." He then gave reasons for rejecting this suggested change. The following data, taken from Drury's figure, strengthen de Selys' view:

Abdomen 77, left hind wing 68, its max. width 18 mm., ratio of these latter two 3.77, max. length dark band of front wings, measured parallel to the costa, 20 mm., its proximal edge at 42 mm. from the base on left side on the vein *M*1+2 and at 47 mm. on *M*4; no milky bands or spots, costal edge of pseudopterostigma, left hind wing, 3.0

mm. The stigma is shown as crossed by about seven vertical lines on the front wings, by eight oblique lines on the left hind wing and solid on the right hind; fork of *Cu*1 12 (front), 13 (hind) mm. long on the left side, reaching into the dark band on all the wings. In none of the wings is the venation exact, especially at the bases, the right and left wings of each pair are different. In the left hind one long vein, apparently *M*4, is omitted altogether, or perhaps consolidated with *Cu*1. *Cu*1 is shown on both left wings as forking 7 mm. proximad to the proximal edge of the dark band, while on the right wings no fork is shown, unless it be hinted at at the very proximal edge of the dark band. No forking of *M*4 and no origin of *M*2 is shown on any wing.

Drury's description reads: "All the wings are reticulated and transparent, having a broad patch of a deep mazarine blue crossing them near the extremities, the tips being transparent." On comparing the figure in the copy of Drury's *Illustrations* at the Academy of Natural Sciences of Philadelphia with Ridgway's *Color Standards and Color Nomenclature* of 1912, the color of the band on the wings of the former is nearest the "Dusky Violet Blue (2)" of Plate xliii of the latter.

Needham[10] and Tillyard[11] have figured the race *brevistigma*, Munz[12] the race *caerulatus*.

With two slight exceptions, to be mentioned presently, I have found no evidence of any geographical or seasonal variations within the few Costa Rican individuals studied in this paper. The five males, Nos. 1-5, taken near Guápiles, June 2-5, 1909, under nearly uniform environmental conditions, do not form a group by themselves, as compared with the other Costa Rican males. I noted at the time that the three males taken along the Florida road, June 3, 1909, "all in the same mile measure as follows: abdomen 69.5, 86, 91, hind wing 58, 70, 79 mm.," respectively Nos. 4, 2 and 3 of page 130 *anteá*. The characters of male No. 7, taken in the same environment, November 18, 1909, fall, in every case, within the range of the corresponding variations of Nos. 1-5. The two slight exceptions referred to are that the three males, Nos. 14-16, from the Pacific Slope of Costa Rica agree in possessing (1) the minimum length (16-18 mm., 19 mm. in the front wings of No. 14) of the dark band of the wings of all the Costa Rican males, those from the Atlantic Slope having this dimension from 27 to 19 mm., and (2) the difference *h* (see above) is from + 4.5 to + 5. mm.; in this latter respect, while homogeneous, they are not isolated, as the Atlantic Slope males show variations from + 3 to + 9. With the few specimens accessible to me it is impossible to determine the significance of these two exceptions; it should be the subject of future study of more abundant material.

(To be continued.)

[10] Proc. U. S. National Mus., xxvi, p. 748, fig. 37. 1903.

[11] Biology of Dragonflies, Cambridge, University Press, pl. i, fig. 8. 1917.

[12] Memoirs Amer. Ent. Soc., pl. viii, fig. 46. 1919.

Supplementary Note on Megaloprepus (Odon.: Agrionidae).

By T. D. A. Cockerell, Boulder, Colorado.

Last year Mr. Terry Duce sent me several specimens of *Megaloprepus* from the head waters of the Rio Carare (Rio Minero), in woods near the Emerald mines of Muzo, Colombia, at altitudes of 2000-5000 feet. Looking them over, I was surprised to find two very distinct forms, which have been described as *cāerulatus* (Drury) and *brevistigma* (Selys). It seemed to me that they were distinct species, not varieties of one as is commonly supposed, so I wrote out my conclusions and sent the manuscript to Dr. Calvert. This led to a very interesting correspondence, and Dr. Calvert has fully stated his conclusions above. There remain certain speculations not covered in Dr. Calvert's paper, and at his suggestion I give these for what they may be worth. The effort is made to treat the problem as a dynamic one, in the belief that sound judgments concerning evolutionary processes may eventually be attained as the result of establishing a multitude of concurrent probabilities. For this kind of work the insects afford the best material, owing to the vast number of different types available for study.

We do not know the existing biological relationships between *cāerulatus* and *brevistigma*. The available information appears to show that in Colombia they fly together, but probably *brevistigma* does not occur north of Panama. In tabulating the characters of the two forms, confusion is introduced because in certain respects the *brevistigma* female is not so extreme as the male, and its curve is overlapped by that of the *cāerulatus* males. Some characters, such as wing-length, are extremely variable in both forms. I dissected out the penis of a Colombia *brevistigma*, and found it quite like that of *cāerulatus* from the same locality, except that in the latter it was distinctly more slender.

Thus we have a type of Odonata, undoubtedly of great antiquity, which presents very few forms, so close as to be regarded as races of a single species. We might expect such

an organism to be very constant in its characters, but instead it is extremely variable. The variations are of such a nature that they cannot in any large part be attributed to the direct effects of environment, and hence we must assume that the insects are strongly heterozygous in their composition. We have no evidence that *cāerulatus* and *brevistigma* cross, but also no grounds for believing that this is impossible. It seems entirely possible that in the comparatively recent times when the Isthmus of Panama was under water, *cāerulatus* was the Central American species, and *brevistigma* that of the Andean region of South America. Existing thus isolated, they may have developed their special characters. Since it became possible to cross from one region to the other, each may have invaded the other's territory, and hybridisation may have occurred, producing an epidemic of variation. But *brevistigma,* having a large range in the Andean region, has remained in part unmodified, though its territory is gradually being overrun by *cāerulatus* from the north. Eventually, especially in the valleys of the Andes, homozygous combinations may be sorted out giving rise to a series of closely allied races or species, as may be seen in numerous genera of butterflies and birds of the same region. Whether this is now in process, can only be determined by elaborate statistical studies of materials yet to be gathered.

A very instructive case for comparison with that of *Megaloprepus* is that of *Steganura,* a genus of African birds, discussed by Mr. J. P. Chapin in *American Museum Novitates,* No. 43 (1922). *S. aucupum* has been considered a subspecies of *S. paradisaea,* but Chapin believes that it is distinct. He supposes that when the equatorial forest was more extensive, *S. aucupum* was restricted to the grasslands north of it, *S. paradisaea* to the south. These birds have now invaded each others territory, and were held by students to be forms of a single variable species. The females cannot be separated with any confidence, but the males in "eclipse plumage" are readily distinguished. Chapin thinks that they do not interbreed, but has no exact information on this point.

A New Genus and Species of Sphinx (Lepid.).

By HENRY SKINNER, The Academy of Natural Sciences of Philadelphia.

KLONEUS, new genus.

Allied to *Pachysphinx* R. and J. Female. Antennae on the upperside clothed with coarse yellow hairs and on the sides and beneath with light brown, velvety pile. Eyes large, 5 mm. in diameter. Palpi large and greatly swollen above and square at the lower end. Thorax unicolorous. Primary wings scalloped as in *Pachysphinx* and the wings of the same shape, widening as the outer margin is approached. Secondaries also scalloped and not entire as in *Pachysphinx*.

Type—Kloneus babayaga n. sp.

Kloneus babayaga, n. sp.

♀.—Upperside. Primaries brown with a curved dark brown band near the apex of the wing; a round spot near the middle of the same color, 4 mm. in diameter; a small dark brown spot at base and a large spot on inferior margin, extending 8 mm. into the wing. Secondaries brown with a dark brown fascia on outer margin 9 mm. wide at top and 3.5 wide at anal angle; inside and parallel to this is a dark brown line.

Underside considerably lighter in color and the primaries and secondaries have two parallel lines crossing from the costa to the inner margin, 9 mm. apart. Expanse of one primary wing 55 mm. and of one secondary 37 mm.

Thorax, abdomen and wings concolorous.

Locality, Eden Mine, Nicaragua, June 13th. 1922, J. S. McKenzie.

Type in the collection of The Academy of Natural Sciences of Philadelphia.

Insecta Part of the Zoological Record for 1922.

The attention of Entomologists throughout the world is called to the fact that, beginning with the Volume for 1922, the preparation of the "Insecta" part of the "Zoological Record," is being undertaken by the Imperial Bureau of Entomology. In order that the Record may be as complete as it is possible to make it, all authors of entomological papers, especially of systematic ones, are requested to send separata of their papers to the Bureau. These are particularly desired in cases where the original journal is one that is not primarily devoted to entomology. All separata should be addressed to The Assistant Director, Imperial Bureau of Entomology, 41, Queen's Gate, London, S. W. 7, England.

The Cordylurid Genus Paralleloma and its Nearest Allies (Dipt.).

By J. R. MALLOCH, U. S. Bureau of Biological Survey, Washington, D. C.

This paper deals with North American species only. The genus *Paralleloma* was erected by Becker for the reception of the species previously placed in the genus *Cordylura* which have the thoracic dorsocentral bristles reduced or almost absent. I recently published, in my paper on the Diptera collected by the Canadian Arctic Expedition, a key to the genera of Scatophagidae in which I cited characters for the differentiation of all the genera then known to me as occurring in America. In the present paper I have proposed a subdivision of the genus *Paralleloma,* which adds two genera to our list, though the species cited as genotypes are among those already known to science.

AMERICINA gen. n.

Differs from *Paralleloma* in having the arista pubescent, prealar bristle absent, posterior notopleural generally present, and the sixth wing-vein traceable to margin of wing though very indistinctly so.

Genotype, *Cordylura adusta* Loew.

Americina adusta (Loew)

The specimens which I have examined are all similarly colored. Shining whitish yellow, black on upper half of occiput, ocellar spot, apex of third antennal segment, broadly on each side of mesonotum and scutellum, on dorsum of mesonotum a longitudinal stripe below and behind base of wings, and the entire abdomen. All tarsi blackened. Wings slightly infuscated at apices.

The posterior notopleural bristle in one male is duplicated. Scutellum longer than in any allied species, slightly flattened on disc, and almost triangular, with 4 bristles, the basal pair shortest. The short stout bristles on ventral surface of mid femur in male distinguish this species from any of its allies.

Originally described from New Jersey and since recorded from New Hampshire. I have taken it in Illinois and seen specimens from Maryland, near Plummers Island (McAtee). and Indiana (Aldrich).

Americina inermis (Loew).

Differs from the preceding species in having the antennae entirely yellow, the dorsum of thorax, scutellum and metanotum black, and the wings clear.

The scutellum is short, with two very long lateral bristles and two minute apical hairs, the legs are entirely without strong bristles, and the tarsi are pale.

Originally described from the White Mountains, New Hampshire. I have seen one male from Viola, Idaho. Cresson has redescribed this species from the northwest as *Cordilura nudicornis*.

ACHAETELLA gen. n.

Differs from *Paralleloma* and *Americina* in having postvertical bristles absent. The sixth wing-vein is continued rather distinctly to the margin, the prealar bristle is present as is generally also the posterior notopleural.

Genotype, *Lissa varipes* Walker.

Achaetella varipes (Walker).

The black body, conspicuously marked black and yellow legs, and black tipped wings of this species distinguish it from any other in the group.

Originally described from Ohio. Since recorded from New Jersey, Wisconsin, Illinois and Montreal, Canada. It is very common and generally distributed in Illinois and the Atlantic States as far south as District of Columbia.

(To be contiuned)

The Life History of Hesperia ericetorum Boisd. (Lepid.: Hesperiidae).

By KARL R. COOLIDGE, Hollywood, California.

Hesperia ericetorum has been recorded from California, New Mexico, Arizona, Colorado and Oregon, and recently Mr. Erval J. Newcomer has written me that the species occurs quite commonly about Yakima, Washington.

It is a fairly abundant butterfly in Southern California, but though possessing a strong flight, is only rarely found at any distance from the vicinity of its food-plants, and for this reason it has sometimes been considered as being quite scarce. About Los Angeles I have found *ericetorum* on the wing practically

every month of the year, and while the various broods so overlap that I have not found it convenient to draw definite sharp lines of distinction between them, my records of the past ten years indicate that there are at least six broods, issuing as follows:

A first brood as early as the first week in February, but only in scanty numbers. On the Colorado Desert, however, the first brood is much more numerous and its members appear as soon as the last week in December. About Los Angeles fresh specimens are again in evidence in late March and early April, while a third brood appears during the first two weeks of June. Again, from the middle of July on another brood comes forth, and the last of September finds a fifth, which in point of numbers, is the largest brood of the season. Then from the first to the middle of October a final brood appears, and after the first week of November until February, specimens are only rarely seen. In all the broods the males appear a week or more prior to the emergence of the females.

Naturally, in the mountainous regions, the broods are more restricted, probably to two or three at an elevation of five thousand feet, and in the still higher ranges limited to a single brood. Mr. Newcomer writes me that in Washington it is double-brooded, appearing in June and in August, with the latter brood much the larger.

Of the life history of *ericetorum* nothing has been recorded except the very brief reference by W. G. Wright (Butt. West Coast) stating that the food-plant is *Malvastrum thurberi*, and that "The egg is white, globular, and laid on the young leaves."

The following food-plants are known to me:

MALVACEAE.

Malvastrum sp.—About Los Angeles commonly on *M. fasiculatum* (Nutt.) Greene, (=*thurberi* Gray), popularly known as "False Mallow" and typically at home in the lower altitudes of the chaparral belt. Other species of *Malvastrum* here upon which I have found eggs or larvae are *M. orbiculatum* Greene and *M. davidsonii* Robinson. On the Mohave Desert the usual food-plant is *M. exile* Gray, while on the Colorado Desert, about the Salton Sea, I have taken larvae from the showy "Five Spot" or "Spotted Mallow," *M. rotundifolium*.

Sphaeralcea ambigua Gray.—Desert Mallow. The common food-plant on the Colorado Desert. In the vicinity of Indio and the Salton Sink I have also obtained larvae from *S. angustifolia* var. *cuspidata*.

Malva borealis Linn.—Cheeseweed, an introduction from Europe. A single specimen bred from this at Los Angeles. *H. tessellata occidentalis* Skinner, which breeds here on *M. borealis*, is also occasionally found on the species of *Malvastrum*.

Althea.—Hollyhock. Mr. Newcomer has sent me specimens bred from this in Washington.

AMARANTHACEAE.

Amaranthus bilitoides Wats.—Pigweed. Mr. Newcomer writes me that he has found the larva on this at Yakima, Washington.

In ovipositing the female seems to prefer the just unfolding young leaves, often tucking the egg in so nicely on the upper surface that it is well hidden from view. But again the egg may be placed on the under surface of the leaves, and even occasionally on the stem.

The egg period varies, but on the average is twelve days. So also there is variation in the duration of the various instars, but on the whole these stages average about fourteen days, and from oviposition to the emergence of the adult a period of seventy-five to eighty days, though in the hot summer months this is greatly shortened.

There is nothing new or of special interest in the behavior of the larvae. The newly hatched larva spins only a few weak, loose strands on the upper surface of the leaf, biting out small irregular holes, and resting in a coiled position. In the second instar the larva spins a rather heavy matting of silk, on which it rests, eating out roundish holes in the leaf. I observed no larvae in the second instar forming regular nests.

But after the second moult the larva builds itself the usual type of nest, forming larger ones as it increases in size, and in every instance under observation pupation occurred within the nest of the final instar, the cremaster being weakly thrust into a small button of silk.

The Egg.—In shape sub-spherical, the base sharply flattened, thence swelling out roundly to the greatest width, in the middle of the lower fourth of the egg.

Traversed by a series of fairly straight but weak longitudinal ribs these are .03 mm. equidistant, with the walls about .001 mm. in thick

ness. Running transversely, a series of similar ribs, but scarcel lower than the longitudinal and forming with them, for the most par, regular quadrate cells, .04 mm. in diameter. From the angles formed by these series of ribs arise blunt spines, .03 mm. in height, .01 mm. in thickness, and inclining apically.

The longitudinal ribs mostly extend to the micropyle, terminating there abruptly, but some coalesce with adjacent ribs before the summit is reached. The micropyle in a rather deep circular depression, .18 mm. in diameter.

Height, .68 mm. Diameter at base, .76 mm. Greatest diameter, .92 mm. Color, when first laid, a pale lemon yellow, soon assuming a nacreous reflection, and in a day or two becoming chalky white.

Larva.—The young larva escapes by eating out a jagged hole in the micropylar region, about .50 mm. in diameter, and does not devour the egg shell.

First Instar.—Body quite even, tapering but slightly posteriorly. Each segment with four, fine, transverse creases.

Head shining black, .48 mm. in diameter. A few, fine, scattered, colorless hairs on head, the longest of these .17 mm. in length. Collar .40 mm. in width, castaneous; the dorsal shield black. Two transverse series of colorless hairs, .16 mm. in length, on the collar.

On the body a number of series of rather high conical pale yellow tubercles, .02 mm. in height and diameter at base, from which project colorless forked hairs in the following series:

A subdorsal row, situated just a little anterior of middle. A laterodorsal row, situated just posterior to middle. A substigmatal central row. The subdorsal hairs project in a straight stem to a distance of .03 mm., where the branch occurs, the posterior branch bending roundly posteriorly, the anterior branch roundly anteriorly; these branches .07 mm. in length, with the stem at base .005 mm. in diameter. The laterodorsal hairs are much smaller, being only .07 mm. in their entire length.

Below the substigmatal row are two, straight, sharp hairs per segment, the anterior one projecting slightly anteriorly, the posterior one bent slightly posteriorly; the posterior hair slightly the longer, .09 mm. in length, while the anterior one is .07 mm. Both hairs are colorless and minutely spiculiferous.

Spiracles pallid, round, .02 mm. in diameter. Anal segment with a few long colorless hairs, projecting posteriorly, .23 mm. in length.

Color of body very pale lemon yellow, with a whitish sheen. Legs very pale gray brown, tipped with black. Prolegs and ventral surface pale lemon yellow.

Length 1.92 mm. Width at first thoracic segment .38 mm. Width at anal segment .28 mm. Height at first thoracic segment .52 mm.

Second Instar.—Body quite uniform, but tapering slightly and evenly posteriorly. Each segment with four, fine, but distinct, creases.

Head black, .84 mm. in diameter; mandibles reddish. Median suture of head rather deep and wide and the head is now very roughly corrugated, densely clothed with rather heavy, blunt and more or less crooked, white hairs, .08 mm. in length on the average. Collar .76 mm. in diameter, dark chestnut brown, the hairs on it white, .08 mm. in length, straight, stout, broken at the tips into four or five sharp prongs. These hairs are in a double row, and in addition there are some scattered similar hairs, very much smaller, .03 mm. in length.

The body now studded with bulbous white papillae, .02 mm. in height and of the same diameter at base, from which project colorless straight and rather thick hairs, .04 mm. in height, broken at the summit into four or five sharp prongs. These bulbous papillae arranged in five, even, regular, vertical rows.

A substigmatal fringe of colorless long, sharp hairs, originating in bulbous papillae; these hairs .18 mm. in length, two to a segment, one anterior, one posterior. Anal segment with a fringe of similar hairs. Spiracles oval, .04 mm. in length, with a heavy white border.

Color of body pale greenish yellow. Legs shining black, tipped with red brown. Prolegs and ventral surface pale yellowish.

Length 4.4 mm. Width at first thoracic .80 mm. Width at anal segment .64 mm.

Third Instar.—Body as before, the white pronged hairs arising from the bulbous tubercles now .12 mm. in length. The bulbous tubercles greenish yellow, .04 mm. in height. The substigmatal sharp hairs .20 mm. in length.

Head 1.2 mm. in diameter, black, roughly corrugated, heavily clothed with pronged white hairs, .08 mm. in length on the average; some similar smaller ones, .04 mm. in length. Collar 1.08 mm. in diameter, with its white pronged hairs .16 mm. in length.

Spiracles pallid, .02 mm. in diameter. Anal segment with a fringe of sharp colorless hairs.

Color of body pale greenish yellow. Legs pale brown, shining, fuscous at tips. Prolegs and ventral surface pale lemon yellow.

Length 7. mm. Width at first thoracic 1.06 mm. Width at anal segment .80 mm.

Fourth Instar.—Body as before, the pronged white hairs arising from the bulbous tubercles .14 mm. in their greatest length, some as short as .10 mm. The white, bulbous papillae mostly .06 mm. in height, but varying considerably. The sharp, substigmatal hairs .30 mm. in length.

Head 1.44 mm. in diameter, black, densely clothed with irregular, filament-like, branching hairs, white, almost completely obscuring the black ground color; these hairs about .1 mm. in length on the average. Collar 1.26 mm. in diameter, black, with its pronged white hairs .18 mm. in length. Spiracles pallid, .03 mm. in diameter.

Color of body pale greenish yellow. Legs pale brown, shining, dark brown at tips. Prolegs and ventral surface pale lemon yellow.

Length 12. mm. Width at first thoracic 1.24 mm. Width at anal segment 1. mm.

Fifth Instar.—Body as before, the colorless, bulbous papillae .06 mm. in height, .04 mm. in diameter; the white hairs arising from these truncate and sharply pronged, projecting to an average height of .12 mm. and .03 mm. in diameter at the summit; the largest of these hairs run to .20 mm. in length. Surface of body finely granulated. Segmental incisures sharply defined, green.

Head 2.90 mm. in diameter, black, rugose, densely clothed with filament-like, branching hairs, white; these hairs are irregular in length, about .5 mm. on the average and by their density almost completely obscure the black ground coloration. Collar sordid white, the fringe of colorless, truncated, pronged hairs on it averaging .34 mm. in length. Spiracles oval, .1 mm. in length.

Color of body pale yellowish green. A narrow, green, dorsal line. A laterodorsal, greenish stripe, indistinct, edged below with an equally indistinct, crenate, pale yellowish line. A substigmatal pale yellowish band. As the stage develops the larva assumes a more and more pale salmon tinting, in some cases quite obliterating the greenish ground color, and the bands become pale pinkish. Legs pale yellow, fuscous at the tips. Ventral surface and prolegs pale green.

Length 27. mm. Width at first thoracic 4. mm. Width at anal segment 2.3 mm.

The Pupa.—Densely covered with a bright bluish dusting, which, however, is easily dissipated. After this bluish dusting has been removed the thorax and the wing cases are yellow mahogany, the wing cases clear and shining. Abdominal segments dull pinkish. Eyes prominent, of a slightly deeper tone of coloration. Cremaster dull black, tipped with reddish.

Rather densely clothed, except on the wing cases, and especially on the abdominal segments, with strong, sharp, pointed hairs, of varying lengths; the largest .54 mm. in length, then shorter ones to .20 mm. These, for the most part, are colorless, but some, especially those on the thorax, are tinged with reddish. The tubercles from which these hairs arise very low, hardly perceptible.

Head case with five distinct patches of hairs, .60 mm. in length quite uniformly. Tubercles by eyes prominent, elevated, black. Spiracles oval, .19 mm. in length, with a fine fuscous ring.

On thorax a fine dorsal line, not observable when the bloom is removed, terminating a little posterior to middle in a short transverse band, more specifically two, more or less connected, quadrate spots; below these, at a distance of nearly 1 mm., two more similar spots, from which the fine dorsal line is continued. On either side of the dorsal line an inconspicuous row of dark points in a semi-circle.

Abdominal segments dorsally with a series of eight, rounded or subquadrate, dark points in a transverse row, not at all prominent until the bloom is removed; these spots of quite uniform size, but the two central ones are always the largest.

Length 16 mm. Width at eyes 4. mm. Width in middle of thorax 4.75 mm. Length of cremaster 1.4 mm.; width of cremaster at tip .34 mm.

The Genus Pseudogarypus Ellingsen (Pseudoscorpionida-Feaellidae).

By Joseph Conrad Chamberlin, Stanford University, California.

Introductory.

Due to its many unusual characters and its unusual systematic position the genus *Pseudogarypus* is possessed of more than ordinary interest to the student of the Chelonethi. So far as known it comprises but a single known species and since this species has so far been but inadequately treated, it has been thought well worth while to go into as great detail as possible in the following treatise. Since my material consists of but a single adult male specimen, it is obvious that in a number of respects this work must be incomplete, but nevertheless a great many facts and characters have been carefully worked out and it has been thought best to present this evidence at this time rather than to await the discovery of more material. The female should prove particularly interesting.

My thanks are due Prof. G. F. Ferris for his everwilling aid and advice. To Dr. R. V. Chamberlin, of Cambridge, I am indebted for the specimen upon which this paper is based.

Historical Remarks.

Pseudogarypus bicornis was first described by Nathan Banks in 1895 from specimens collected in the Yellowstone National Park. While realizing some of its unusual features and remarking that it would possibly fall in a group generically distinct from *Garypus*, the genus to which he referred it, he did not bring out its distinctive features at all clearly and hence the species was practically lost sight of for many years. With, in his excellent paper of 1906, fully realized some of its unusual

features and commented that a new genus would probably be necessary for its reception. Finally, in 1909, Ellingsen, who had received a single specimen from Shasta Springs, California, erected a new genus for its reception which he called *Pseudogarypus*. He gave no figures and did not discuss it in any detail so that is has never aroused the interest to which its unusual features and characters entitle it.

Determination.

There are several discrepancies between Banks' description and my specimen but these are, I am convinced, due to Banks' misinterpreting some of the characters of his specimen rather than to any valid difference. As Ellingsen remarked in his paper, "I have no doubt that the animal I have before me belongs to the same species described by Nathan Banks in spite of one or two differences between Banks' description and my animal." That this determination is probably correct is further enhanced by the geographical proximity of Bear Lake, Utah, where my specimen was collected, to the Yellowstone National Park, the type locality of the species. The close coincidence in measurements between my specimen and the measurements of the species as given by Ellingsen, make it seem very nearly certain that Ellingsen's specimen is also conspecific with mine.

Systematic and Morphological Section.

Feaellidae Ellingsen.

1906—Feaellidae Ellingsen, Ann. Mus. Civ. Stor. nat. Genova. (3): II: 260-263: IV.

1906—Feaellidae Ellingsen, With, D. kgl. Dansk. Vid. Selsk. Skrift. 7. Række, nat. og. math. Afd. III: 58.

1908—Feaellidae Ellingsen, With, Særtryk af Vidensk. Meddel. fra den naturh. Foren. Copenhagen. 8-12: I figs. 1-10.

Diagnosis—All tarsi single-segmented; tarsi always longer than tibiae; all femora divided into a pars basalis and pars tibialis by a freely movable ginglymous articulation; eleventh tergite and tenth (eleventh?) sternite fused into a single ventral shield which bears centrally the anal opening which is provided with a bi-partite operculum; with four eyes.

Remarks—The above characters will include the only two known genera of the family. Ellingsen, in his paper of 1909

(on *Pseudogarypus*), does not make it clear whether or not he considered *Pseudogarypus* as falling into the Feaellidae or not. He rather noncommittally states that it will stand more or less between *Feaella* and *Garypus*. While the differences between the genera are considerable, the resemblances are likewise numerous and consequently it is my opinion that the two genera will fall into the same family. The most striking difference is in the pleural abdominal plates of *Feaella*, but since *Pseudogarypus* possesses a well-defined cephalothoracic pleural plate even this difference is not as great as it may seem. However, I think there is no doubt that the two genera are representatives of two distinct sub-families.

As to the relationship of the family as a whole I am not at present competent to speak. As a purely tentative opinion I think that there is considerably more resemblance to the *Chthoniids* and especially the *Obisiids* than the leg structure warrants me to believe. However, the single-segmented tarsi are not too great a barrier, since their elongate structure gives some reason for thinking that this may be due to a secondary fusion of an originally two-segmented condition. This same feature is exemplified in the Chthoniidae where we find elongate fore tarsi which are single-segmented, while the hind tarsi are of the typical two-segmented structure of the *Obisiidae*, *Garypidae*, etc. My conclusion is based to a great extent on the structure of the male genitalia, which strikingly resembles in several respects those of the *Chthoniid-Obisiid* group of genera. For example, the remarkable genital sacs here figured for *Pseudogarypus* are almost duplicated in *Garypinus* (Chamberlin, 1923) and the two crescent-shaped posterior chitinous portions which bear the setae (Fig. 14-b) find their counterpart in both the *Chthoniids* and certain of the *Obisiids*.

FEAELLINAE Ellingsen.

Diagnosis—With a well developed ginglymous articulation between the cephalothorax and the abdomen; apparently without a distinct cephalothoracic pleural plate; with a dorsal lateral row of fifteen small pleural plates and a similar row of fourteen ventral pleural plates; carapace bearing along its anterior

margin a double row of prominent bulges or rather tuberculate processes; palpi of a distinctly aberrant type, not shaped at all as in Garypus but approaching to some extent those of the Chthoniidae.

For further information concerning this sub-family see the references listed under the family heading, all of which concern this sub-family only. So far three species have been described in the genus *Feaella,* two from Africa (*mirabilis* from Portuguese Guinea; *mucronata* from Natal) and one (*affinis*) from the Seychelles Islands.

(To be continued)

A New Species of the Genus Buenoa (Hemiptera, Notonectidae).

By H. B. HUNGERFORD, Lawrence, Kansas.

During August of 1922, under the auspices of the Entomological Survey of Minnesota, Doctor Harry Knight, Mr. Wm. E. Hoffmann and the writer made a 1200-mile collecting trip through Minnesota. Special attention was given to the aquatic insects of this region of innumerable lakes and ponds, A portion of the journey was along the north shore of Lake Superior to Grand Marias. North of Grand Marias and some fifteen miles from the lake, we camped by a large beaver pond. This pond occupies a basin hemmed in against a high hill by a meandering glacial eskar. This high and well-defined ridge, after running for some distance parallel with the hill, makes a wide crescentic curve to the hill, thus disputing the right of way with the drainage between hill and eskar. A stream had cut a narrow gap of a few rods through the eskar, and at this strategic place, the incomparable rodent engineers have built a high dam, forming a pond that is at least eight feet deep in spots and covers several acres.

Here and there stand stark trees, killed when the water encompassed them, and piles of drift brush lodged in time of freshet. The water is stained therefore with the amber color characteristic of such places. This first dip of the writer's net brought up two specimens of a beautiful new species of back-

swimmer. Diligent collecting by Mr. Hoffmann and the writer secured a splendid series of this most striking and distinct North American *Buenoa*.

The apparent isolation of this insect and our failure to collect it elsewhere in our rather careful search for aquatic Hemiptera, is worthy of note. Like the others of its genus, it swims submerged, and its body is richly supplied with the blood-red oxyhaemoglobin-bearing cells. It, like the smaller *B. elegans* Fieb., swims in the shallow, protected waters along shore, differing thus from *B. margaritacea*, which prefers the deeper water.

Buenoa limnocastoris species new.

Size: Length, 6.25 mm. to 7 mm.; width across the eyes in largest female, 1.3 mm.; greatest body width, 2 mm. The males are more slender, the head being fully as wide as greatest body width, the average being about 1.2 mm. for head width.

Color: The living insects are very striking in their pattern of black and white, the limbs and underside of body deep mahogany. The prothorax is whitish with a smoky to black patch on either side above the margin; scutellum colorless; elytra whitish with shining black band covering humeral angle and extending along the anterior margin of wing for about one-third of its length, another large, triangular, black spot at tip of corium, extending across the wing; propleura of prothorax black, opaque; parapleural plates black, save a yellow patch along ventral margin; longitudinal dark area on sides of thorax visible through the transparent wings; the abdominal segments immediately beneath the corial black patches, black; abdominal venter blackish in dead specimens; median longitudinal black stripe on beak, all the tibiae and hind femora. In life the rich red of the oxyhaemoglobin within the abdomen, shows through the sides of abdomen and makes the venter dark mahogany.

Shape: The eyes are protuberant and prothorax narrow, markedly narrower than the head in both sexes, and impressed with two longitudinal depressions more or less distinct. The pronotum of the male inflated, and in dead specimens the disc stands up as a transparent elongate, heart-shaped area, divided longitudinally by the median carina Scutellum reduced, narrow, elevated, but depressed near its front margin by a deep transverse groove.

Structural Peculiarities: Tylus prominent, more prominent in male than female. Synthlipsis narrower in male than in female in which it is less than half the vertex. In cephalic view the inner margin of eyes parallel.

Pronotum faintly tricarinate in the female, more distinct in the male; in lateral view the pronotum of the male is strongly arched and inflated, the lateral margins prominent and distinctly ledged, the lateral areas beneath the ledge depressed. Scutellum reduced in both sexes, relatively larger in female than in male; in the female, scutellum two-thirds length of pronotum and a little less than one-third length of elytral suture; in the male scutellum is not more than one-half length of pronotum and less than one-third length of elytral suture. Claval orifice just behind tip of scutellum, two-thirds the length of scutellum in both sexes. Surface of elytra rastrate and pebbled, especially in the black areas; the dark sides of pronotum above the ledge sparsely rastrate, also the upper half of parapleural plates.

Front femora greatly swollen in male and somewhat thickened in female. Front tibiae flattened in both sexes, broader at base in male and bent along its long axis; tarsi two-segmented in both sexes. Middle femora slender, angulate; tibiae flattened, not quite attaining distal end of trochanter when limb is flexed; tarsi two-segmented, segment one not quite a third longer than two; tarsal claws about one-third length of distal tarsal segment in male, claws more developed in female, about one-half distal segment; front and middle limbs equipped with strong, mobile setae. Hind limbs flattened and fringed, tibia one-seventh shorter than the femur; hind tarsi two-segmented, segments subequal in length, tarsus about one-fifth shorter than hind tibia.

Described from a long series taken near Maple Hill, Cook County, Minnesota. *Holotype* in University of Minnesota collection, *allotype* in University of Kansas collection, *paratypes* in University of Minnesota, U. S. National Museum and following private collections: W. E. Hoffmann, J. R. de la Torre Bueno, R. F. Hussey, Dr. Carl Drake, Dr. H. M. Parshley and that of the writer.

NOTES: This species is quite unrelated to the *Buenoa margaritacea-platycnemis* series, which have orange in their coloring and are very compactly formed creatures. Furthermore, each of the above species has a head that fits firmly against the short pronotum, a large scutellum as long as the pronotum at least, and very broad; and in them, the elytral orifice is less than one-third the length of the scutellum, which is more than one-half the elytral suture.

The new species is much more nearly related to what we know as *B. elegans* Fieb. This latter species I have taken in large numbers in what is known as "Stubbs Pond," near Law-

rence, Kansas. *B. elegans* Fieb. is considerably smaller, however, and structurally distinct. The new species has, in general, the same coloring—black and white. The humeral and corial black spots are the same. The black stripe on sides of thorax in *B. elegans* Fieb. is more prominent, but in all of my specimens, the pronotal lateral spots are lacking. I have specimens of this smaller species which lack all black markings.

In structure, the two species are quite distinct: the eyes of *B. elegans* are closer together; in males the synthlipsis very narrow, eyes almost touching; the pronotum is not arched and scutellum is much larger. In the male the scutellum is three-fourths as long as pronotum, more than twice as long as elytral orifice and one-third as long as elytral suture; in the female the scutellum is relatively larger, being as long as pronotum. In side view the difference between these two species is especially well marked in the males. *B. limnocastoris* has front femora more strongly incrassate and pronotum arched. Furthermore, the male genitalia show them to be distinct.

Notes on Two Species of Lepidoptera Described by Guenée (Noctuidae, Geometridae).

Acronycta clarescens Gn.

1852, Gn., Spec. Gén., V, Noct., I, 54, *Acronycta.*

M. C. Oberthür, *Études de Lépidoptérologie Comparée*, XVII, 21, states: "L'étiquette écrite par Guenée, auteur toujours extremement sincère, est ainsi conçue: 'Je ne me rapelle pas si cet individu a servi á ma description, mais j'ai tout lieu de le croire.'" On plate DV, fig. 4217 this specimen is shown. In view of the fact that M. Guenée appeared to be in doubt whether this specimen served for his description or not and the fact that there is a specimen labeled "type" in the British Museum, which corresponds to *A. clarescens* in the sense used by Hampson and later authors and where the Doubleday specimens described by Guenée should be, the present authors are led to disagree with Dr. McDunnough, who placed *pruni* Harris synonomous, in a recent paper—(1922 Ent. News., xxxiii, 228).

With doubt cast upon the authenticity of M. Oberthür's type by M. Guenée himself, there seems to be no other course available than to accept the type in the British Museum as representing the species. The synonomy in the Check List (B. & McD., 1917) will stand unaltered.

Xanthorhoe defensaria Gn.

1851, Gn., Spec. Gén., X., 411, *Coremia.*

1920, Oberthür, Etud. Lepid. Comp., XVII, 23, (pl. DVII, f. 4240, Fig. type?, *convallaria?, guenéeata?*) *Coremia.*

1922, McD., Ent. News, XXXIII, 229, *Coremia.*

Dr. McDunnough, evidently not seeing the text of the *Études*, states that M. Oberthür's figure cannot represent the type of *defensaria* and "represents a specimen of *Perizoma polygrammata*, Hlst. or one of its close allies."

The species figured by M. Oberthür is probably *Perizoma custodiata*, Gn=*guenéeata* Pack.

Wm. Barnes and F. H. Benjamin, Decatur, Illinois.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., MAY, 1923.

Those Unlabeled Figures.

A short time ago, in preparation for an exercise of our professorial function, we studied Dr. W. T. M. Forbes' paper on *The Wing-Venation of the Coleoptera* in the Annals of the Entomological Society of America for December, 1922. We do not profess any expert knowledge of beetles but we have made preparations of the wings and we have followed the general outlines of the work of Lameere, Gahan and others on the application of venation to the classification of the Coleoptera. Our expectations that we would derive much instruction from Dr. Forbes were realized. We must confess, however, that what made a greater impression upon us was the fact that we were constantly compelled to turn back several pages from his plates to find out just what genus a given figure represented. At last there appeared to be nothing else to relieve our growing disgust than to take pencil and write the name of the genus alongside each one of the 71 figures on the seven plates. Our kindly feelings toward the author and the editor were not improved by these labors. It was a relief not to be obliged to repeat this performance in studying Mr. G. A. Graham's paper on the same subject in the June, 1922, number of the same Annals.

We wrote in the NEWS for October, 1921:

> One source of annoyance to the reader of illustrated papers arises from having to compare figures relating to different forms on a plate and to hunt for the names of the species in an "Explanation of Plates," or even in a list of names at the bottom of the plate. Why would it not save time and irritation and prevent neglect if we put the specific [or generic] name (or an abbreviation of the name) alongside each figure, or group of figures, on the plate itself?

A frequent contributor of papers with many illustrations to our entomological journals, with whom we had some corre-

spondence on this question of labeling figures, wrote that, while this was desirable, the expense of having the names *engraved* was prohibitive. We never dreamed of engraving. An author who draws his own figures, as most of us do, can surely lay his plate of drawings on a board with a straight edge, level it with a T-square, make two parallel pencil lines separated by an appropriate distance, near each figure or group of figures, and with his pen insert the name of the genus or species, as the individual case requires, between these guiding lines.

But of course we don't expect these suggestions (not to use a stronger word) to do any good where improvement is most needed. Those who, like Mr. Knight in the NEWS for March, 1923, are already convinced of the desirability of this practice will continue in their praiseworthy course, but those, otherwise minded (and we don't class Dr. Forbes here)—

But the editors of our entomogical journals *can* do something to improve the condition complained of. Will they?

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

On the Geographical Distribution of Thorybes confusis Bell (Lepid.: Hesperiidae).

Though this species was described from specimens collected at Tampa, Florida, it appears that its geographical distribution covers a wide range over the southern part of the United States.

In the paper of Dr. Henry Skinner and Mr. R. C. Williams, Jr., *On the male genitalia of the Larger Hesperiidae of North America* (Transactions of the American Entomological Society of Philadelphia, Pa., XLVIII, 124), it is recorded from Blanco County, Texas; Georgia, South Carolina and North Carolina, and I have received specimens from Hope, Arkansas; Jennings, Missouri; Takoma Park, Maryland, and Washington, D. C., and have seen some from localities in Alabama.

The distribution of this butterfly therefore probably covers all of the States from Maryland, south to Florida, west to Missouri, Arkansas and Texas, and further collecting will very likely record it from the states immediately west of Arkansas and Missouri, as it does not seem at all scarce at Hope, Arkansas, which is quite close to the Oklahoma line, while its occurrence at Washington, D. C., and nearby places in Maryland make it seem probable that it will also be found in Delaware and possibly the extreme southern portion of New Jersey.—E. L. BELL, Flushing, N. Y.

Professor and Mrs. Cockerell to Visit Siberia.

My wife and I expect to visit the coast of Siberia during the summer. Very good fossil insects have been found there. We expect to leave Seattle June 7, have four days in Japan and reach Vladivostock June 25.

T. D. A. COCKERELL.

Robbery! High Reward! Warning to Buyers!

In the summer of 1921 the following species were stolen from our establishments: *Parnassius davidis, honrathi, simo, delph.* v. *cardinalis, charltonius, princeps, imperator* ♂, *musageta, nordmanni, etc.*, note especially: *imperator* ♀, *musageta* ♀, with gigantic ocellae, *charltonius verus* ♂, *bryki* ♀, Co-Types, as well as many exotic Lepidoptera (probably already stolen in 1920) especially show specimens and rarities.

We promise a high reward to everyone being able to furnish us any notice about these insects and we guarantee to use their information under the strictest discretion. In case one or the other above mentioned species should have been offered to you by dealers or by persons, even seemingly highly trustworthy, please send us the correspondence.—DR. O. STAUDINGER & A. BANG-HAAS, Dresden-Blasewitz, Germany.

Vitality of a Cecropia Moth (Samia cecropia, Saturnidae, Lep.).

In the early part of the Winter, Mr. William Jay, of Mt. Airy, Philadelphia, brought me a branch of elder on which was clustered a compact bunch of eleven Cecropia cocoons, some of which were dead, but quite a few were alive. Wishing to retain the cluster of cocoons intact, I soaked them in gasoline, with the idea of killing such pupae as were alive. The cocoons were hung in a room where the temperature was kept at about seventy degrees Fahrenheit. On February 4, a male moth emerged; I placed the moth out of doors where it remained all night in a temperature between 15 and 17 degrees. In the morning the moth to all appearances was dead; I took it in the house and placed it in a room where the temperature was 50 degrees. In about an hour I noticed a twiching of the feet, so I removed the moth to a warmer room where the thermometer registered 72. In an hour the moth was flying around the room.—PHILIP LAURENT, Philadelphia, Pa.

Bolletino della Scuola Superiore d'Agricoltura de Portici.

The authorities of the Scuola superiore d'Agricoltura of Portici, Italy, are desirous of increasing the range of diffusion of their *Bolletino* and are making a subscription price of two dollars per volume to American entomologists. This journal contains many very important articles and is well worth the price asked for it. It should be on the shelves of all our entomological libraries. Correspondence concerning subscriptions may be addressed to Professor F. Silvestri at the school.—G. F. FERRIS, Stanford University, California.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record. Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B

The titles occurring in the Entomological News are not listed.

2—Transactions of The American Entomological Society, Philadelphia. **4**—Canadian Entomologist, Guelph, Canada. **6**—Journal of the New York Entomological Society. **7**—Annals of The Entomological Society of America, Columbus, Ohio. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **14**—Proceedings of the Zoological Society of London. **15**—Insecutor Inscitiae Menstruus, Washington, D. C. **19**—Bulletin of the Brooklyn Entomological Society. **20**—Bulletin de la Societe Entomologique de France, Paris. **34**—Bulletin de la Societe Entomologique de Belgique, Brussels. **45**—Zeitschrift fur wissenschaftliche Insektenbiologie, Berlin. **46**—Contributions to the Natural History of the Lepidoptera of North America. Ed. by Wm. Barnes. **49**—Entomologische Mitteilungen, Berlin-Dahlem. **54**—Proceedings of the Biological Society of Washington, D. C. **68**—Science, Garrison on the Hudson, N. Y. **70**—Journal of Morphology, Philadelphia. **86**—The Quarterly Journal of Microscopical Science, London. **88**—Occasional Papers of the Museum of Zoology, University of Michigan, Ann Arbor. **98**—Annals of Tropical Medicine and Parasitology, Liverpool. **101**—Journal of The Linnean Society of London. **111**—Archiv fur Naturgeschichte, Berlin. **114**—Entomologische Rundschau, Stuttgart. **115**—Societas Entomologica, Stuttgart. **138**—American Museum Novitates, New York.

GENERAL. Berlese, A.—Gli insetti, Vol. II, Fasc. 28-33. **Brues, C. T.**—Choice of food and numerical abundance among insects. **12,** xvi, 46-51. **Felt, E. P.**—Problems in economic entomology. **12,** xvi, 39-45. **Graham & Ruggles**—The obligation that economic entomology owes to forestry. **12,** xvi, 51-61. **Hagan, H. R.**—Historical outline of the development of entomology to 1800. (Trans. Utah Acad. Sci., ii, 47-54). **Horn, W.**—Et meminisse et vaticinari liceat. **49,** xii, 67-i. **Leng, C. W.**—Memories of fifty years ago. **19,** xviii, 1-12. **Sanders, J. G.**—Whither in entomology. **12,** xvi, 31-9.

ANATOMY, PHYSIOLOGY, ETC. **Bowen, R. H.**—Studies on insect spermatogensis. **86,** lxvi, 595-626. **Cannon, H. G.**—A further account of the spermatogenesis of lice. **86,** lxvi, 657-67. **Huettner, A. F.**—The origin of the germ cells in Drosophila melanogaster. **70,** xxxvii, 385-419. **Yocum, H. B.**—The occurrence of Telosynapsis in the male germ cells of an Hemipteron, Leptocoris trivittatus. **70,** xxxvii, 287-306.

ARACHNIDA AND MYRIOPODA. **Brolemann, H. W.**—Notes on female paraiulids (Myriapods), with description of a n. sp. **7,** xv, 281-309. **Stear, J. R.**—Introduced mite attacking willow. **12,** xvi, 96.

THE SMALLER ORDERS OF INSECTA. **Krafka, J.**—Morphology of the head of trichopterous larvae as a basis for the revision of the family relationships. **6,** xxi, 31-52. **Mertens, H.**—Biologische und morphologische untersuchungen an Plekopteren. **111,** 1923, A, II, 1-38. **Sulc, K.**—Eine neue Psylla und eine neue Rhinocola aus Surinam. Eine neue Panisopelma und eine neue Trioza aus Chile. Ueber die stinkdrusen und speicheldrusen der Chrysopen. (Sitz. Bericht. Bohmischen Gesel. Wiss., Math.-Natur. Clas., 1914, IV, V, IX). **Tillyard, R. J.**—The wing-venation of the order Plecoptera or mayflies. **101,** xxxv, 143-62. **Walker, E. M.**—Notes on the Odonata of Godbout, Quebec. **4,** lv, 5-12. **Williamson, E. B.**—Notes on the habitats of some tropical species of Heterina. A new species of Archaeogomphus. (Odonata). **88,** No. 130; 134.

ORTHOPTERA. **Carpentier, F.**—Musculature et squelette chitineux. (Mem. Ac. R. Belg., Cl. Sci., vii, Fasc. 3, 56pp.) **Hebard, M.**—Studies in the Mantidae and Phasmidae of Panama. **2,** xlviii, 327-62.

Davis, W. T.—A new walking-stick insect from eastern N. A. **6,** xxxi, 52-55.

HEMIPTERA. **Baker, A. C.**—Tingidae. **68,** lvii, 272. **Hungerford, H. B.**—Notes on the eggs of Corixidae. **19,** xviii, 13-16. **Matthews, A. L.**—Some uncommon plant pests. (Trans. Utah Acad. Sci., ii, 41-4.) **Osborn, H.**—Neotropical Homoptera of the Carnegie Museum. (An. Carnegie Mus., xv, 8-79.) **Otanes, F. Q.**—Head and mouth-parts of Mecoptera. **7,** xv, 310-27. **Parshley, H. M.**—The type specimens of Lygaeus kalmii, subsp. angustomarginatus. **19,** xviii, 23.

Davis, W. T.—Notes on N. American cicadas with descriptions of n. sps. **6,** xxxi, 1-15. **Horvath, G.**—A new species of Galeatus from New Mexico. (An. Carnegie Mus., xv, 108-9.) **Knight, H. H.**—A new sp. of Labopidea on garlic. **19,** xviii, 31. **McAtee, W. L.**—A new sp. of Otiocerus (Fulgoridae). **54,** xxxvi, 45-8. **Olsen, C. E.**—Studies of the species in the genus Cicadella of America, north of Mexico. **7,** xv, 353-69.

LEPIDOPTERA. Bell, E. L.—Amblyscirtes textor from Virginia. Euphyes dion in New Jersey. Collecting notes on L. Collecting Florida butterflies in March. **19,** xviii, 12; 21; 24-27. **Draudt, M.**—Fauna americana. Genera Eudamus-Heronia; Lithosiinae: Chrysozana-Tigrioides. (Seitz. Macrolep. of the World, Part 266-272.) **Gaede, M.**—Alte und neue Arctiinae des Berliner Zool. Mus., **114,** xl, 7-8 (cont.). **Heinrich, C.**—On the synonymy of the pea moth. **4,** lv, 13. **Jordan, K.**—Ueber einige alte und neue Sphingides. **49,** xii, 51-7. **Kaye, W. J.**—A catalogue of the Trinidad Lepidoptera Rhopalocera. (Mem. Dep. Agric. Trinidad and Tobago, No. 2, 1921, 163pp.). **Kruger, E.**—Weiteres ueber Columbische Brassoliden. **114,** xl, 8 (cont.). **Lavallee, A.**—Comportement et homochromie de la chenille du Sphinx pinastri. **20,** 1923, 19-20. **Prout, L. B.**—New species and forms of Geometridae. **11,** xi, 305-22. **Schaus, W.**—New sps. of Nŏtodontidae from S. America in the Carnegie Museum. (An. Carnegie Mus., xv, 80-9). **Seitz, A.**—Fauna americana. Micrarctiinae: Eubaphe-Leptarctia. Spilosomini: Spilosoma-Turuptiana. (Seitz. Macrol. of the World, Part 272, 273). **Stichel, H.**—Beitrage zur kenntnis der Riodiniden fauna Sudamerikas. **45,** xviii, 1-9.

Barnes & Benjamin—Nomenclature, notes and new species. **46,** v, 53-96. **Fruhstorfer, H.**—Neue Parnassiusrassen aus Nordamerika. **115,** xxxviii, 5. **Mayfield, H. D.**—A new form of Catocala gracilis. **19,** xviii, 33.

DIPTERA. Beyer, G. E.—Observations upon Anopheles atropos. **15,** xi, 51-6. **Bishopp, F. C.**—Dengue fever and mosquitoes in the South. **12,** xvi, 97. **Branch, H. E.**—The life history of Chironomus cristatus, with descriptions of the species. **6,** xxxi, 15-30. **Dyar, H. G.**—Note on the swarming of Aedes cinereoborealis. Mosquito notes. Notes on Goeldia. On Aedes riparius. Note on the habits and distribution of Aedes flavescens in America. Note on Aedes winnipegensis and hirsuteron. **15,** xi, 56-7; 81-88; 88-92; 92-4; 94-6. **Gordon & Evans**—Mosquitoes collected in the Manaos region of the Amazon. **98,** xvi, 315-38. **Komarek, J.**—Die morphologie und physiologie der haftscheiben der Blepharoceridenlarven. (Sitz. Bohmischen Gesel. Wiss. Math.-Natur. Clas., 1914, XXV.) **Lenz, F.**—Stratiomyidenlarven aus quellen. Ein beitrag zur metamorphose der Stratiomyiden. **111,** 1923, A, II, 39-62. **Matheson & Shannon**—The Anophelines of northwestern America. **15,** xi, 57-72. **Milliken & Wadley**—Phasia occidentalis, an internal parasite of the false chinch bug. **19,** xviii, 28-31. **Plank, H. K.**—New record for Rhagoletis tabellaria. **12,** xvi, 99. **Shannon, R. C.**—A new Microdon from Bolivia. **15,** xi, 80-1. **Thompson, W. R.**—Masicera senilis, a parasite of the European corn borer. **10,** xxv, 33-44.

Aldrich, J. M.—Notes on the dipterous family Hippoboscidae. **15,** xi, 75-9. A new sugarcane miner. **19,** xviii, 22-3. **Hearle, E.**—A

new mosquito from Br. Columbia. **4,** lv, 4-5. **Hull, F. M.**—New Syrphidae from Mississippi. **7,** xv, 370-73. **Malloch, J. R.**—Some new g. and sps. of Lonchaeidae and Sapromyzidae. **10,** xxv, 45-53. A new N. Am. species of the genus Beckerina. The N. Am. sps. of the chloropid genus Cetema. **19,** xviii, 32-3. **Shannon, R. C.**—A reclassification of the subfamilies and genera of N. Am. Syrphidae. **19,** xviii, 17-21.

COLEOPTERA. Bowditch, F. C.—Studies among the American Galerucidae. **9,** lvi, 62-4. **Dury, C.**—Lepidocricus herricki. **19,** xviii, 27. **Forbes, W. T. M.**—The wing-venation of the Coleoptera. **7,** xv, 328-51. **Lucas, R.**—Coleoptera fur 1916. (Mit nachtragen zu fruheren berichten). **111,** 1917, B, V, 1-325. **Mueller, R.**—Ueber die sinneszellen im fuhler von Necrophorus vespille. **114,** xl, 5-7 (cont.). **Mutchler, A. J.**—Notes on West Indian Lycidae and Lampyridae, with descriptions of new forms. **138,** No. 60. **Pavlovsky, E. N.**—On the biology and structure of the larvae of Hydrophilus caraboides. **86,** lxvi, 627-56. **Van Duzee, E. P.**—An entomological antique. **68,** lvii, 269. **Verhoeff, K. W.**—Beitrage zur kenntnis der Coleopteren-larven mit besonderer berucksichtigung der Clavicornia. Zur kenntnis der Canthariden-larven. **111,** 1923, A, I, 1-109; 110-37. **Wolcott, A. B.**—Two n. sps. of West Indian Cleridae. **138,** No. 59.

Blatchley, W. S.—Notes on the C. of southern Florida, with descriptions of n. sps. **4,** lv, 13-20.

HYMENOPTERA. Bell, E. L.—A hymenopterous parasite of Epargyreus tityrus. **19,** xviii. 33. **Bluthgen, P.**—Zur biologie der bienengattung Sphecodes. **45,** xviii, 19-23. **Criddle, N.**—The life habits of Cephus cinctus in Manitoba. **4,** lv, 1-4. **Cushman, R. A.**—A new subfam. of Braconidae from termite nests. **10,** xxv, 54-6. **Davis, W. T.**—Late swarming of ant Lasius claviger. **19,** xviii, 23. **Elliott, E. A.**—Monograph of the hymenopterous family Stephanidae. **14,** 1922, 705-831. **Frison, T. H.**—Systematic and biological notes on bumblebees. **2,** xlviii, 307-26. **Stumper, R.**—Etudes sur les fourmis. V. Les reflexes de nettoyage. **34,** v, 29-31.

Banks, N.—Notes and descriptions of some fossorial H. **4,** lv, 21-3. **Cockerell, T. D. A.**—The earliest known ponerine ant. **9,** lvi, 51-2. Two nocturnal bees and a minute Perdita. **138,** No. 66. **Curran, C. H.**—A new genus and sp. of Xyelidae from western Canada. **4,** lv, 20.

A NATURALIST ON LAKE VICTORIA, with an Account of Sleeping Sickness and the Tse-tse Fly. By G. D. HALE CARPENTER, Uganda Medical Service, etc. E. P. Dutton & Co., New York. 8vo., pp. xxiv, 333, 2 col. pls., map, charts, 87 ills. First published in 1920.

The extent of entomological literature is so great and the ability to examine it so limited by the various demands on one's time, that we

make no excuse for admission to the pages of the NEWS of notices of articles and books which have been published for some years, or have not been sent to the NEWS for review, as happens in this case. We regret that so few notices of entomological literature are offered to us for publication, and would gladly welcome more.

Dr. G. D. H. Carpenter, son of the well-known zoologist and student of the echinoderms, P. H. Carpenter, F. R. S., investigated the bionomics of the Tse-tse fly, *Glossina palpalis*, at various places on or near Victoria Nyanja[1], from the middle of 1910 to about March, 1913, from December, 1913, to August, 1914, and for some period subsequent to November, 1918, under the auspices of the Tropical Disease Committee of the Royal Society. "This book is an attempt to give an account of the life on the islands of the Victoria Nyanja." The first three chapters contain one of the best, summarized, historical narratives of Sleeping Sickness, its natural history and that of *Glossina palpalis*. Three chapters furnish a description of the lake, three are devoted to the vertebrates. The last four (pp. 195-322) deal with insects, 80 of these pages being concerned with the coloration of insects, as displayed in Uganda, and with the case of *Pseudacraea eurytus*. This last is a member of a genus of Nymphaline butterflies closely allied to the more widely spread *Limenitis*, but confined to the Ethiopian region, including Madagascar. *Ps. eurytus* is "a single, [widespread], polymorphic species [which] mimics sundry species of models of very different appearance in different localities; where a model is sexually dimorphic the sexes of the mimic faithfully copy the corresponding sex of the model. Yet in the very locality where this dimorphism of model and mimic exists, other species of monomorphic models are closely copied by monomorphic forms of the same species of mimic" (p. 242). That the various forms of *eurytus* are not different species is shown by the facts that, (*a*) there are no differences in the genital armature of the males, as pointed out by Dr. Karl Jordan in 1910, and (*b*) that from the eggs of the same female, reared by Dr. Carpenter, the varied forms of both sexes are produced (p. 264).

Prof. E. B. Poulton contributes a preface to this volume and many extracts from his letters to the author are contained in the chapter on *Pseudacraea*. Dr. Carpenter writes as an adherent of the theories of the value of coloration of which Prof. Poulton is so well known an advocate, and presents arguments in favor of the origin of mimetic varieties as due to natural selection as against mutation.

Notes on almost all the greater groups of insects are to be found in this book, which can be strongly recommended to entomologists and lovers of nature generally. PHILIP P. CALVERT.

[1]"Nyanja, not Nyanza. The former is Luganda for lake, the latter means nothing, and is erroneously copied from one book to another."

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GENERAL.

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EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

For Exchange—A large number of live cocoons of Callosamia promethea, C. cynthia and P. cecropia for other pupae or Lepidoptera. D. C. Heim, Sunbury, Pa.

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Need American Entomologist III (N. S. I.) No. 12; Bulletin Brooklyn Entomological Society VI, VIII, IX and X No. 2 and index; Ann. Repts. Entomological Society Ontario, II, III, IV, IX; Entomologica Americana, VI; U. S. D. A. Bureau of Entomology bulletins, old series, 2, 3, 9, 20, 33.

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